SCIENCE.—SUPPLEMENT.

FRIDAY, APRIL 16, 1886.

INVENTORY OF PHILOSOPHY TAUGHT IN AMERICAN COLLEGES.

In the general overhauling which the college curriculum has been receiving of late, there has been one subject quite generally overlooked,—that of philosophy. Apart from an occasional editorial note in the columns of *Science*, I have seen next to no allusion to the matter. Yet it is difficult to see how we are to develop a high grade of national culture in science and in literary matters without contact, by way either of stimulus or of mirroring, or of both, of these matters with philosophic principles. Where this contact is to occur, unless in college, it is also difficult to see. I have no intention of discussing theee matters here; but I wish to give an inventory of the present condition of philosophic instruction in our colleges, based upon the catalogues of these institutions. Neither my knowledge nor the limit of space allows me to go beyond a consideration of the subject taught to discuss methods, etc.

The philosophic discipline of the ordinary American college is a survival of that period of its existence when its especial deed was to furnish to the community well-fortified ministers of the gospel. The catalogues of our colleges reveal all stages of evolution from this original source, but all show their genetic connection. The extent of the evolution may be shown by considering the courses of four of the older New England institutions, selected from as many states. In Dartmouth the instruction begins with a twenty-four-hour course in natural theology, followed by twenty hours of anthropology. The *piece de resistance* is sixty hours of psychology (Porter's 'Elements'), which is supplemented by courses in ethics (twenty-five hours), history of ancient philosophy (twenty-six hours), aesthetics (fifteen hours), and, to complete the circle with which the instruction began, a thirty-hour course in the evidences of Christianity. All this, certainly no insignificant amount, is required work. There is one elective of thirty-two hours in the history of modern philosophy.

Crossing the Connecticut River, and coming to the University of Vermont, we find the following courses: psychology (Sully), logic (Davis's 'Theory of thought'), ethics (Calderwood), a short course in aesthetics, another short one in the evidences of religion, and quite an extensive course in metaphysics, in which Watson's 'Kant's philosophy in extracts,' and the exposition of Kant by Professor Morris, are used. At Williams, as in the University of Vermont, all philosophical work seems to be required, the curriculum including the following subjects: anthropology (Hopkins's 'Outline study of man'), logic, theology (dogmatic, apparently), natural theology (through the medium of Flint's 'Theism,' and Butler's 'Analogy'), ethics, and the history of philosophy. At Brown we find logic, three hours a week; intellectual philosophy, four hours, including studies in Hamilton, Kant, Porter, Sully; ethics, five hours, including Wayland, Calderwood, Kant, etc. There is also a course in natural theology. In addition to these required courses, there is an elective in the history of philosophy.

None of these colleges, it will be observed, is now a professedly denominational college. It may be well, accordingly, to add one which is; viz., Trinity. Here the required work is ethics (through the medium of Wayland), Butler's 'Analogy' and his sermons, metaphysics (Sir W. Hamilton), and courses in psychology and logic. Elective courses are those in anthropology (Hopkins); ethics, two courses,—one in Haven, and the other in Whewell and Plutarch, and metaphysics (McCosh). No very great differentiation is observable in these courses, although there is more ethics, and more ethics from a theological stand-point, in Trinity than in other colleges.

We turn now to the other end of the scale of evolution, where the courses are almost wholly lecture courses, and are, either entirely or in the major part, elective; and in which, also, the instruction is mainly from the historical side. Of such institutions, Harvard and the University of Michigan are instances, perhaps the only ones. In the latter college, the only required study in this line is a course in either psychology (Murray) or logic (Jevons). Elective courses are, two in psychology, one in experimental and another in its relations to philosophic problems. The course in the history of philosophy is three hours a week through the year. This is supplemented by a three-hour course in the principles of philosophy, followed by a study of Hegel's 'Logic.' The courses under the general head of ethics would include a course in ethics, historical and theoretical; one in the philosophy of state and history; and a course each

in Plato's 'Republic' and Aristotle's 'Ethics,' occupying together two hours per week through the year. Other courses are, one in Spencer's 'First principles,' and one each in aesthetics and Kant's 'Critique of pure reason,' the latter two being omitted this year.

The Harvard courses include in the history of philosophy, English philosophy, from Locke to Hume; French, from Descartes to Leibnitz; and German, from Kant to Hegel; and one each in German philosophy of the present day and Hegel's 'Phaenomenologie,' which are omitted the present year. Psychology and logic (Bain and Jevons) are covered in one course; there is also an advanced course in experimental psychology. There is a course in the philosophy of nature, discussing Spinoza and Spencer. There are also five courses in ethics and philosophy of religion, comprehending one on philosophy in relation to ethics and religion (Royce's 'Religious aspects of philosophy'); one on philosophy of religion; another on philosophic theism; one on historical ethics, including especially, it appears, Mill and Kant; and one on practical ethics of modern society. The account would be incomplete if we failed to notice Professor Goodwin's courses in Plato's 'Republic,' and in the history of philosophy before Aristotle, with Professor Greenough's course on later Greek philosophy. All of these courses are elective. It will be noticed that there are about the same number of courses given in both the two last-mentioned universities, but the courses appear to cover more hours per year at Harvard than at Michigan.

Intermediate between the two classes of colleges discussed, come, in the east, Yale and Princeton; in the west, the universities of Wisconsin and California. At Princeton there are required courses in psychology, logic, ethics, and Christian evidences; elective courses in physiological psychology, metaphysics, history of philosophy, and science of religion; and graduate courses in Plato's 'Philosophy,' and one hour per week of discussion of philosophic problems. At Yale almost the only required studies in the senior year are the philosophic courses. The required studies are as follows: logic, psychology, ethics, natural theology, and evidences of Christianity; the electives are, the history of philosophy, two hours through the year; a course in Locke and Berkeley for two hours first half-year, followed by 'special topics' the second half; and a two-hour course in physiological psychology through the year.

The list of colleges given might be considerably increased; but it suffices, I think, to justify the division of colleges, so far as their philosophic teaching is concerned, into three classes, of which the first would include by far the greater number of institutions. Did space permit, it would be interesting to give the courses in two or three of the best Canadian colleges. The practice there is to divide the subjects into 'pass' and 'honor' subjects; the former being psychology, logic, and ethics, and the latter including quite a wide range. At McGill, for instance, besides courses in the history of ancient and modern philosophy, the student must pass an examination on twelve masterpieces; for example, Aristotle's 'Ethics,' Descartes' 'Method and meditations,' Spinoza's 'Ethics,' Fraser's 'Berkeley,' Spencer's 'First principles,' etc. At University college, Toronto, this honor-work requires such solid reading as Green's 'Introduction to Hume,' and his 'Prolegomena to ethics.'

For the most part, these courses speak for themselves to one familiar with the courses in German universities, or even in Great Britain in the present renaissance of philosophy there. The greatest lack is undoubtedly in the department of the philosophy of nature. The philosophic interpretation and criticism of the principles of modern science seem to be unknown save at Harvard and the University of Michigan. The greatest advance which any one familiar with the philosophic announcements of the last eight or ten years will notice is the growing tendency to introduce the history of philosophy, and especially the study of the originals, particularly in Plato, Aristotle, Kant, and even Hegel. A striking and welcome phenomenon is the increasing disuse of Sir William Hamilton. I do not say this with especial reference to his philosophy, but because it is safe to say that the sole ideas which the vast majority of graduates of our colleges have of continental philosophy, have come, directly or indirectly, through Hamilton and Cousin; and it is difficult to say which is the more misleading as an authority in historic philosophy. Princeton presents one innovation, whence, I think, almost all of our colleges could learn something. It has called in men from its biological department to discuss physiological psychology. The discussion of the one subject of visual sensation and perception could easily be made remarkably fruitful for psychology, as well as leading up to the subject of space-perception in general, and the question of empiricism and intuitionalism, and the function of evolution in psychical life. It is no discredit to our teachers of philosophy to say that it is almost impossible that they should have special knowledge in physiological psychology. The instructor of to-day has now, in the subject of logic, psychology, ethics, the history of philosophy, and what is vaguely called 'metaphysics,' to cover a wider field than the

teacher of any other branch; and restriction of subjects rather than their enlargement is the need.

It is impossible to discuss the subject of the future of philosophy-teaching in this country without reference to the mooted question of 'electives.' It is evident that the great majority of those American colleges that have not introduced the elective system are giving all the time to philosophic studies possible, though I do not undertake to say whether or not that time be distributed in the wisest way. In fact, the outside scoffer would probably say that relatively too much time is given them, when all studies are required. It will be noticed that the colleges where least philosophy is required are the ones where most is taught, and the ground is most widely covered. Personally, I should not be surprised to know that they are the ones where most vital interest is taken in these studies, save in the instances, happily many, of the smaller colleges, where the philosophic teaching is in the hands of a man of such strong character that the teaching is a lasting power for life in an ethical way, whatever may be said of the strictly technical value of the philosophy taught.

JOHN DEWEY.

INSECTIVOROUS PLANTS.

THE peculiar insect-capturing habits of certain of our native plants were observed nearly a century ago, and the belief was then entertained that the peculiar phenomena served some direct object in the plants' economy; in other words, that the captured insects served as nutritive material. These observations, however, were long forgotten, or received but little attention, till, in 1875, Darwin's well-known work on insectivorous plants appeared. Since then a very great impetus has been received by botanists in their study, that has resulted in large additions to the literature of the subject. In a recent paper by the well-known botanist of Jena, Prof. W. Detmers (*Nord und süd*, 1886, 72, 81), a review of our present knowledge is given, from which the following is obtained.

At present it is well known that the function of the green tissue is the absorption of carbonic acid from the surrounding medium under the influence of light, and its decomposition and formation therefrom of organic compounds. Most of the higher plants are capable of complete and perfect development solely by the aid of purely inorganic materials, though in the larger number organic matter may and does form a share of the nutritive material. In the economy of nature this function is a most important one, as plants thus occupy an intermediate position between the animal and inorganic kingdoms.

But some plants are not thus provided with the green or chlorophyl tissue, and are dependent more or less upon organic foods. In some, as the mildews, the power of transforming inorganic to organic substances is wholly wanting; while in others, as, for instance, certain orchids, such as Neottia nidus avus, the power is much restricted. Likewise the mistletoe, though sufficiently rich in chlorophyl, derives much of its material from the sap of trees upon which it is parasitic. Insectivorous plants, in the same way, seem to occupy an intermediate position between those dependent entirely upon inorganic and those which derive their material purely from organic sources.

The term 'insectivorous,' as applied to plants, is, however, not strictly correct, nor would 'carnivorous' be much better. Different forms of animal life are captured by such plants as have received this appellation, and by the aid of secreted juices are digested and absorbed; but there is no mechanical action except in capturing and holding the objects, and therefore 'flesh-digesting' would express more correctly the process.

One of the best known of insectivorous plants is the 'sundew' plant (Drosera), species of which are distributed over nearly the whole world. It is small and low, growing about meadowy places, and conspicuous for the sparkling drops of fluid substance that are seen upon its leaves. The leaves, which are about four millimetres in diameter, have upon their upper surface a large number of peculiar tentacle-like organs, as many as two hundred in some cases. The ones in the middle are shorter and upright; those near the sides, longer and more horizontal. Each tentacle consists of a stem, permeated by a spiral tube, and a glandular head, which emits a drop of colorless, sticky, and stringy fluid. This substance apparently serves to attract insects as well as to retain them when once they have alighted upon the leaf, as it is seldom that they are able to extricate themselves after coming in contact with it. To yet further assure this retention, the leaves possess the power of closing or folding together, brought about slowly by the irritation conveyed through the tentacles. An insect thus firmly enclosed remains till the fluids secreted by the tentacular glands have caused its solution, or, more properly, digestion. Any foreign object, be it mineral or animal, will cause the closure of the leaf and the secretion of fluids; but there is this remarkable difference, — a mineral substance only produces the flow of an acid secretion, while an insect or piece of flesh causes, in addition, a

secretion of pepsin. The process is almost precisely like that which occurs in the animal stomach, — a secretion of acids and ferment produced by the contact of digestible substances. The ferment or pepsin is not, however, a peculiarity of such plants alone. The milky sap of many others contains the same substance, and almost generally throughout the vegetable kingdom a ferment is produced in seeds during germination, rendering the reserve material, upon which the young plant is dependent, assimilable.

Yet better known is another plant of the same family (Droseraceae), the venus fly-trap (Dionaea), that grows in the wet lands of North Carolina. The leaves, about six centimetres in length, springing from the ground, have an elongated, winged stalk, bearing an orbicular leaf at its extremity, which is capable of sudden folding or closure. Along the margin of each leaf are a number of long, immovable, bristly hairs; and near the middle of each side, on the upper surface, three slender irritable hairs, which have the peculiar power, when touched, of conveying the irritation to the leaf-tissue, and causing immediate closure, the marginal bristles crossing each other, and preventing any possibility of escape. In addition to these hairs, there are a large number of glandular bodies attached by a short stem, which not only secrete the digestive fluids, but also serve as absorptive organs for the digested material. An insect or any digestible substance caught by this singular contrivance remains enclosed a relatively long time, while an inorganic or non-digestible object is much sooner released.

In a very different way the leaves of species of the pitcher-plant (Nepenthes) serve to entrap insects. Here the long leaf is prolonged into a tendril, which bears at its apex a tubular or oblong pitcher, sometimes a foot or more in length, closed with a hinged lid. About its rim there are a number of nectar-secreting glands, by which insects, and especially ants, are attracted. Entering easily into the upper part of the tube, they fall from the smooth surface to the bottom. Here there is a very large number of secreting glands, which, singularly, only in consequence of the irritation produced by the insects, pour out a considerable quantity of digestive fluid. This secretion shows, in the presence of albumen and flesh, a strong acid reaction, which, together with the associated pepsin, acts energetically upon animal substances, digesting them in a short time.

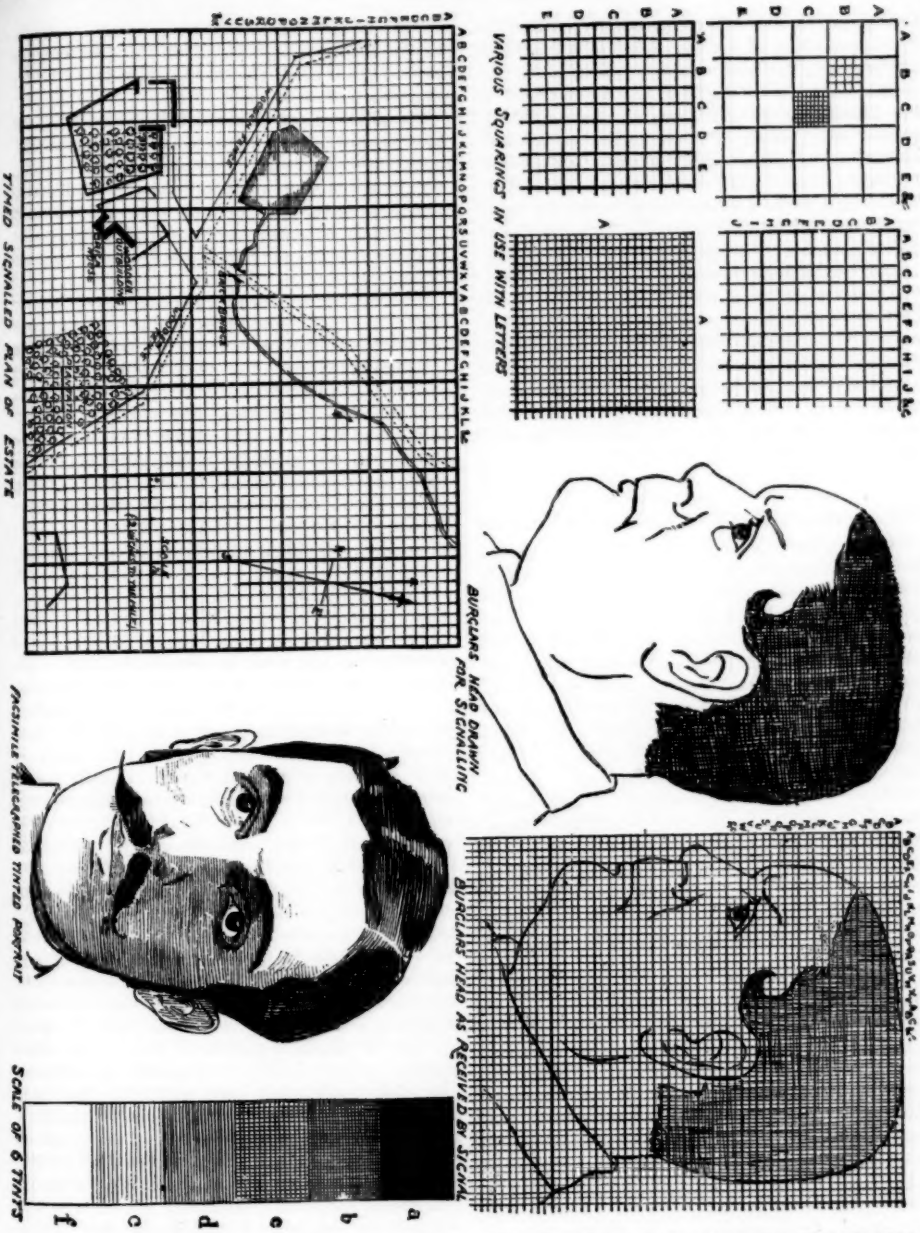
Again, species of our native Saracenia have the ascending hollow leaves so enclosed by a lid as to prevent the entrance of rain-water, but, by the nectar glands, attract and entrap insects, which are digested by the abundant secretion at the bottom. In addition to these, the aquatic bladderworts, or Utricularia of Europe and North America, although secreting no digestive fluid, may properly be classed among the insectivorous plants. The small bladders are so closed by a valve as to admit the ingress of insects, crustaceans, or newly hatched fish, but prevent their egress; and, from the large number that they are frequently found to contain, it is very probable that the ensuing decomposition is of direct advantage to the plant in furnishing nutritive, absorbable compounds.

The question, finally, whether organic material obtained and dissolved by the plant in the ways briefly described is indispensable or serviceable as nutrition, is important. Various carnivorous plants have been cultivated, secluded for a long time from all contact with organic material, without apparent deterioration in their development, so that it may at once be determined that such matter is not indispensable. However, in experiments with plants of Drosera rotundifolia, all kept under precisely the same circumstances, except that some were deprived entirely of organic food-material, while others received insects from time to time, it was found that the latter throve much better, and fructified much more abundantly.

These views, that the substances are of direct benefit to the plant, are, however, contested by Dr. Behr in a late number of the *Pharmaceutische rundschau*, who claims that it is not proved that the dissolved material is taken up as nutritive material, and so made use of. Its presence within the cells, or in the tissue of the plants, may be explained by simple capillarity, which is further evidenced by the absorption of inorganic substances, such as arsenious acid, by means of the secretions, as has been recently shown by Jaeger.

This opinion Dr. Behr supports by observations on species of Nepenthes, where he found that the pitchers, after the reception and solution of insects, were in no wise strengthened, but became injured and withered; and in cases of Drosera sulfurea and rosulata, where he likewise found that the leaves which had captured an insect always withered, and where many leaves were thus robbed of their true function, the plant weakened and died. He mentions the singular fact that the larvae of certain insects (Xanthoptera semicocca) are known to live in the exudations of Saracenia variolaris without being affected by the digestive fluids, — habits very similar to the known ones of bot-flies in the animal stomach.

It is very difficult indeed to understand how such remarkable contrivances, in connection with true digestive fluids, can exist, save on the theory that their function is a real one, and that they


TINTED SIGNALLED PLAN OF ESTATE
VARIOUS SQUARINGS IN USE WITH LETTERS
BURGLARS HEAD DRAWN FOR SIGNALLING
FACSIMILE TELEGRAMMED TINTED PORTRAIT
BURGLARS HEAD AS RECEIVED BY SIGNAL
SCALE OF 6 TINTS

subserve some direct use in plant-economy, and are not, as Dr. Behr would affirm, acquired peculiarities directly injurious to the organism.

A METHOD OF SIGNALLING DIAGRAMS.

AN ingenious system of adapting the alphabetical messages of the electric telegraph, or of the

heliograph, or any other signalling apparatus, to the reproduction at distant points of some kinds of drawings, has been recently contrived by Mr. Alexander Glen of England, and is described in the London *Illustrated news* of March 20. It seems likely to be of some utility in military operations, as it is especially suitable for the transmission of small maps or plans of a locality. The design to be transmitted is drawn on ruled paper, divided into little squares by vertical and horizontal lines. The operator at the transmitting-station can thus indicate by alphabetical letters to the receiver any point on the paper falling in the centre of any square; the person at the receiving-station will apply his pencil to that point, and will then be directed to the next point, drawing a line with the pencil, and so on to form a complete outline-drawing. Patches of shading, of the several darker or lighter tints shown in a separate diagram, may be put in by special directions.

BIBLIOGRAPHY OF INDIAN LANGUAGES.

Many years since, the present director of the bureau of ethnology became interested in Indian tribes of the west, and began to study their languages. The study of the spoken language from the mouths of the speakers naturally led to the study of books containing accounts of languages no longer spoken, or spoken by people not personally visited. As books began to be studied, the desire and the need of examining more books relating to the subject were felt to be necessary for the solution of the problems involved. A card-catalogue was therefore begun, of the books, pamphlets, magazine and other articles, manuscripts, etc., which were needful for an exhaustive study of the relationships of the native tribes as based upon language. This catalogue grew and grew. How great it was or is destined to become, if absolutely completed and perfected, no one yet knows.

Every lover of systematic, complete, and accurate work owes a debt of thankfulness to the bureau of ethnology and the compiler of this formidable volume; and he owes this debt, not because the work is complete (for it is still incomplete), and not because it is free from inaccuracies (for there are inaccuracies, though these are neither important nor numerous), but he is grateful for this monument of systematic, thoroughgoing research, and for a persistent devotion to a lofty ideal of bibliographic work. Had a less lofty ideal of completeness or excellence been set up, the book would have been beyond all criticism. The very excellence of the ideal affords ground, and the only ground, for the friendly criticism we beg to offer.

The titlepage of this printed but unpublished book is, and is intended to be, a standing invitation to criticism from all competent judges. We say printed but not published, since a manuscript note informs us, 'one hundred copies printed,' and the printed titlepage informs us that these one hundred volumes are 'distributed only to collaborators,' and also that they are 'proof-sheets.'

It is the fulness of the present catalogue, the time and labor spent upon it, the bibliographic spirit which pervades it, taken together with the titlepage, that bring into the strongest relief the perfect ideal in the author's mind, and at the same time his clear perception of the mode, and the only mode, for the attainment of this ideal. The author has set before him, and kept steadily in view, the purpose, first, of hunting up every scrap of published, printed, and even manuscript information in existence, relating to the subject; second, of recording a description of each work so full and so complete that it need never be recorded more fully or more completely; third, of telling where each work catalogued may be found; fourth, of giving a clear notion of what the document is, and what it contains relative to his subject, telling where, within the work cited, the linguistic material is to be found; and, lastly, of so putting the whole together that whoever has occasion to use this bibliography may learn all that he needs or cares to know about any book catalogued, and its contents, without actually seeing it at all.

The value of any work so broadly conceived and so fully executed as this, can hardly be overstated. With the great increase of knowledge in all directions, it is absolutely essential to progress that the fields to be investigated be first systematically mapped out, to the end that seeming new discoveries may be new, and not rediscoveries, and that energy be not, through ignorance, wasted in repeating work already well done. The sciences are now advanced to that state, that further satisfactory progress is only to be made by ascertaining what has already been done. To this end, and to so exhibit the work already accomplished in any line, is the work of the bibliographer. The general outline of the proposed plan of the bibliography is here shown, and the opinions of competent judges as to its merits and defects are respectfully solicited with a view to their use in the finished book or books, if books should be found necessary to contain the material which shall constitute the work.

Proof-sheets of a bibliography of the languages of the North American Indians. By James Constantine Pilling. Washington, *Government*, 1885. 1175 p. 4°.

Preceding the general alphabetical authors' list of books, which constitutes the great bulk of the book, is a list of the bibliographical authorities consulted, this list numbering a hundred and twelve entries, covering twenty-six pages. This list, being one subordinate to the general purpose for which the book is to be used, might go in a subordinate or smaller type, thus saving in two ways; to wit, in the space occupied, and in showing by the type itself that the list was subordinate to the main body of the work. In the very full index at the close of the book, and which constitutes the subject-catalogue, this plan is followed with good effect, and a complete subject-catalogue of Indian linguistics is thus printed on forty-five closely printed pages.

The serial numbers which accompany each title, and which are printed on the left, would interfere less with the catch-word of the title if transferred to the right; and the catch-word, the author's name, might then advantageously be brought to the left, a little beyond the line of the text. These detailed matters of printing here introduced and commented upon, though in general uncalled for, are pertinent to the present notice, since these are proof-sheets, and hence the finally adopted form is presumably not yet settled. Moreover, these questions admit of a more intelligent and satisfactory settlement from the existence in print of this material, which might, perchance, be denominated "Proof-sheets of material collected with a view of constructing an exhaustive bibliography of the languages of the native races of North America." This would seem to be a tolerably precise characterization of both the book and the author's conception of it. The term 'Indian' on the titlepage is of course used to include all native races, Eskimo, Aztecs, etc. Whether the word should be so used, is a matter for the ethnographer rather than the bibliographer.

The size of the work, and the fact that while going through the press two hundred and fifty pages of additions and corrections accumulated, show the importance of considering whether finally it will not be better to break this bibliography up into several subdivisions, so that, instead of having a very large bibliography of North American linguistics, we may have a more useful work, consisting of several parts, each devoted to a special group of languages, such as Algonkin, Eskimo, etc. All bibliographies should provide for growth. In any very comprehensive one, the first part begins to be antiquated before the last part is reached. Moreover, bibliographies, if of comparatively small subjects, can be revised, and kept up to date; but it is a formidable undertaking to revise, enlarge, and bring up to date, a work so large as this.

As the present tendency is pronouncedly in the direction of full bibliographies of small subjects, the most important question to be considered in the publication of this work would seem to be as to whether it should be one single bibliography of a very large subject, or a series of bibliographies of a number of small subjects.

Would it be better to prepare a bibliography of mathematics, or a series of bibliographies, on the different subdivisions of mathematics? And in meteorology will the signal service best serve the meteorological public by issuing one grand bibliography of meteorology, covering the entire field, or by subdividing into various heads, such as 'observations,' 'instruments,' 'theories,' etc., and issuing smaller bibliographies, covering the more limited fields? It is not our purpose to discuss these questions, but, rather, to sharply draw attention to them for the purpose of having them well considered before a final form is adopted.

The author is, in our opinion, to be congratulated upon selecting the form of an authors' catalogue rather than the subject-catalogue. The authors' catalogue admits practically of but a single arrangement, — the alphabetic, — since in any large list the chronological order proves of far less general utility.

The subject-catalogue, however, admits of several arrangements: it is always subject to radical changes based upon increased knowledge or new and revised systems of classification; and, lastly, to use a subject-catalogue, the system of classification used in that particular catalogue must be studied. It therefore seems far wiser, as Mr. Pilling has done, to make the index serve as the subject-catalogue.

DISEASES OF THE FORE-BRAIN.

THE scope of this work is indicated in its title. It is an attempt to explain both the nature of mental action and the perversions of that action from the data of the anatomist and the pathologist. Professor Meynert has no superior in Europe in the department in which he has written. To him anatomists owe much that is new and important in the knowledge of the structure of the brain. It is to be expected, therefore, that the results of his life-work should be regarded with great interest. In a comparatively small

Psychiatry: a clinical treatise on diseases of the fore-brain, based upon a study of its structure, functions, and nutrition. Part i. By THEODOR MEYNERT, M.D. Tr. by B. Sachs, M.D. New York, *Putnam*, 1885. 8°.

compass he has given an exhaustive description of the masses of gray matter and intricate network of white fibres of which the brain consists; and he has done this from the stand-point of a comparative anatomist, which greatly enhances the values of his statements. There is such rapid progress being made in the department of nervous diseases, that it is perhaps not surprising that a few of the positions held by the author will need to be modified in the second volume: in fact, he admits this in his preface. But the great mass of the facts stated in the text are fixed and definite, and must be familiar to all future investigators in this field.

To the general reader the physiological portion of the volume will be much more attractive than its anatomical details. Here, again, Meynert is worthy of attention. It is pretty generally admitted that the method of introspection so long advocated by psychologists is incapable of giving satisfactory results in the investigation of those processes in which mind and matter meet: hence of late years new methods have been sought. One of these is to study the mental processes as they develop in the infant, and to watch the manner in which ideas are acquired and voluntary powers become available. This method has been employed by Preyer and Kussmaul in Germany, and by Dr. Mary Putnam Jacobi in this country. Meynert has made use of it to some extent in discussing the manner in which knowledge is acquired and stored up, and in which the various memories gained through the senses are associated. For example: if a pin touches the eye of an infant, the lid closes. This is a reflex act carried out by a simple mechanism independent of any act of consciousness; but, coincident with the reflex act, a number of impulses are sent to the brain, along fibres which, on reaching the cortex, give rise to the conscious perception of the appearance of the pin, of the pain of the prick, and of the motion which has been performed. Each of these perceptions occurs in a different part of the brain, since each sensory organ is joined to an area of its own. But the three perceptions occur simultaneously; and, as all parts of the cortex are joined with one another by fibres passing from one area to the next, the three perceptions are associated both in perception and in memory: hence, when the pin is seen again, the memory of the pain arises, and the memory of the motion which stopped the pain; and thus the mere sight of the pin leads the child to close the eye. The perception of the reflex motion has given the infant the knowledge of the possession of a muscle capable of movement; and the motion, having once become conscious, can be reproduced voluntarily by an effort which excites to action those cells which retain the memory of the motion (pp. 156–161).

A second method of psychological investigation is that of experimental physiology. This is open to the objection that many acts of animals are misinterpreted by physiologists, who look at many of the acts as manifestations of voluntary mental action instead of being instinctive. The differences of those who advocate or oppose the localization of functions as deduced from experiments are to be traced rather to their varying interpretations of the result of the experiments than to those results themselves. Meynert is a believer in the localization of functions, as is every physician who has seen much of brain-diseases, and he presents clearly the arguments in its favor derived from the investigations of Fritsch and Hitzig and Munk. A third means of studying the relations of mind and matter is the consideration of individuals who present disturbances of mind associated with definite forms of destruction of brain-tissue. Meynert's opportunities for such study are very great, as he has at his disposal the immense number of patients collected in the Vienna hospital. That he has made good use of his material is evident in the sections of this work which treat of the functions and nutrition of the brain. In the next volume this part of the work will be fully expanded. By means of these three methods much that is new and entertaining has been found in the physiology of thought, and much that is important both to the alienist and to the psychologist is brought forward. The book, therefore, appeals to a rather wider circle of readers than its title would indicate.

Those who have read the original will sympathize with the translator in the difficulties of his work. It is a misfortune of the author that he is at points exceedingly abstruse and even obscure; and this fact, as well as the very technical style of the original, has rendered the task undertaken a serious one. It has been done in a painstaking manner, the original being followed as closely as possible, without, at the same time, taking from the English its own construction and idiom. The translation has been made with the consent of the author and by one of his pupils. It is evident that he has labored hard, although in some places the meaning is difficult to grasp. This difficulty is to be traced to the original, as can be determined by a comparison of the two, and hence must not be laid at the door of the translator. The manner in which the publishers have presented the volumes is to be commended, no expense having been spared in reproducing the many valuable diagrams and illustrations of the original.

M. A. S.